> **The primitive decision regions in an Atlas LSH neural network are angular cells induced by the locality-sensitive hash. However, these cells are not rigid classification boxes. Angular proximity allows neighbouring cells to contribute to the same decision, effectively enlarging the decision region when appropriate, while learned linear associations can bridge entirely separate cells when the data requires it.**

This gives the architecture three complementary mechanisms:

1. **Angular partitioning**
    - The LSH divides the input sphere into many angular cells.
    - Each cell corresponds to a particular combination of LSH bits.
    - These cells provide the basic "propositional" units.
2. **Neighbourhood smoothing**
    - Inputs with similar directions usually differ by only a few LSH bits.
    - The network can exploit this by allowing nearby cells to share evidence.
    - This produces larger effective decision regions without abandoning the discrete representation.
3. **Associative bridging**
    - Linear weights can connect cells that are far apart geometrically.
    - Two distant angular regions can therefore produce similar outputs if experience shows they should.
    - This separates **geometric similarity** from **semantic similarity**.

An interesting consequence is that the effective decision boundary is not determined solely by the LSH tessellation. Instead, it emerges from the interaction between:

- the angular partition created by the LSH,
- local interpolation across neighbouring cells,
- and global associations learned through the weights.

That is quite different from a conventional multilayer perceptron, where every neuron continuously influences every input. Here, the LSH provides a sparse, explicit geometric scaffold, and learning modifies how that scaffold is used rather than constructing geometry entirely from dense matrix multiplications.

The random hyperplanes used to generate the LSH bits are only intermediate measurements. The actual regions that the network reasons over are the intersections of many half-spaces—the angular cells defined by the complete bit pattern. Those cells become the fundamental units of representation, with neighbourhood interactions and learned associations allowing the model to move beyond a purely cell-by-cell lookup.